TOPIC: University of Maryland, College Park: Master of Science in Information Systems (MSIS)

COMMITTEE: Education Policy and Student Life

DATE OF COMMITTEE MEETING: March 11, 2014

SUMMARY: This proposal is a continuation of a larger effort to disaggregate the concentrations in the M.S. in Business (MSB) that started in Fall 2013 with the degree in Finance. Separation of the concentrations within the MS in Business will allow students to pursue more than one area of expertise for those who desire to do so. The proposed Master of Science in Information Systems would replace the existing concentration in Information Systems. No curriculum changes are anticipated, but offering a separate degree with the words "Information Systems" in the title will better articulate on the diploma the credentials of students graduating from the program and make them more competitive in international markets where the degree in Information Systems is more common. The Smith School also offers a joint MSB/Information Systems-MBA degree and thus the University also seeks to convert this option to a joint MBA-MSIS program.

Information Systems is a popular and growing field, and a number of institutions within Maryland offer similar programs. Some have similar elements in their curriculum but none are substantively similar to the program at College Park in content or delivery. Towson University offers an MS in Applied Information Technology through the College of Science and Mathematics. The degree is completed by earning at least one certificate (e.g., in Database Management Systems) along with completion of 18 elective credits, either online or face-to-face. The degree can be completed online or on campus. The program does not include the focus on Business and Analytics that are part of our core curriculum and ours is a fulltime, on-campus program. University of Maryland, Baltimore County offers an MSIS consisting of 39 credits, open to students from a variety of backgrounds. UMBC also offers an online version targeted at working professionals, consisting of 34 credits which can be completed in 2 years. Our program is distinguished from this one based on the core courses in Business and Analytics. Our program is on-campus only, and can be completed in as little as one year. John Hopkins University, Carey School of Business, offers an MSIS as a part-time program in Washington, targeting working professionals with at least two years of experience. In contrast, ours is a full-time program open to students with any level of experience. University of Maryland, University College offers a wide variety of online MS degrees. The most similar is the online MS in Information Technology. Students select among several areas of specialization (e.g., Homeland Security, Information Assurance) that are not covered in our program. Bowie State University offers a Master of Science in Management Information Systems, including a concentration in Information Assurance. These programs, in which students can participate either full-time or part-time, do not require the GMAT or GRE.

UMCP also offers a Master of Information Management (MIM) through the College of Information Studies (the iSchool), and an MS in Computer Science which is a significantly more technical curriculum embedded within the Computer Science doctoral program. The MIM, offered both at College Park and at the Universities at Shady Grove, is a broad-based data management curriculum that integrates elements of computing and information technology in a manner that is not, generally, discipline specific. In contrast, the MS in Information Systems is a business-oriented degree program focusing on the use of data and information to support key business decision-making. While there is some overlap in the curricula, these three programs are quite distinct in terms of overall training and career paths.

ALTERNATIVE(S): The Regents may not approve the program or may request further information.

FISCAL IMPACT: There is no fiscal impact.

CHANCELLOR'S RECOMMENDATION: That the Committee on Education Policy and Student Life recommend that the Board of Regents approve the proposal from the University of Maryland, College Park to offer the Master of Science in Information Systems.

COMMITTEE RECOMMENDATION: Approval   DATE: March 11, 2014

BOARD ACTION: DATE:

SUBMITTED BY: Joann Boughman   301-445-1992   jboughman@usmd.edu

UNIVERSITY SYSTEM OF MARYLAND INSTITUTION PROPOSAL FOR

X   New Instructional Program

_____ Substantial Expansion/Major Modification

_____ Cooperative Degree Program

X   Within Existing Resources, or

_____ Requiring New Resources

University of Maryland College Park

_____

Institution Submitting Proposal

Master of Science in Information Systems

_____

Title of Proposed Program

Master of Science	**Fall 2014**
Award to be Offered	Projected Implementation Date

	11.0103
Proposed HEGIS Code	Proposed CIP Code

Robert H. Smith School of Business	**Katherine Stewart**
Department in which program will be located	Department Contact

(301) 405-0576	**kstewart@rhsmith.umd.edu**
Contact Phone Number	Contact E-Mail Address

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Signature of President or Designee	**February 17, 2014**
	Date

Mission

The University of Maryland College Park mission statement includes a goal to "continue to build a strong, university-wide culture of graduate and professional education" and to provide knowledge-based programs and services that are responsive to the needs of the citizens of the state and the nation. The Robert H. Smith School of Business promotes this mission through its objective to grow future leaders to address the increasingly relevant global issues of our time. As part of this goal, the Smith School currently offers an internationally competitive Master of Science in Business degree with several concentrations, one of which is a concentration in Information Systems Management (MSB/IS). ***This proposal is to replace the MSB/IS with a standalone degree program with the title Master of Science in Information Systems (MSIS). No curriculum changes are anticipated,*** but offering a separate degree with the words "Information Systems" in the title will better articulate on the diploma the credentials of students graduating from the program and make them more competitive in international markets where the degree in Information Systems is more common.

This proposal is a continuation of a larger effort to disaggregate the concentrations in the M.S. in Business, that started in Fall 2013 with the degree in Finance. Three other concentrations will also be proposed for conversion to standalone programs: Accounting, Market Analytics, and Supply Chain Management. These will be submitted as separate proposals. Separation of the concentrations within the MS in Business will allow students to pursue more than one area of expertise for those who desire to do so.

The Smith School also offers a joint MSB/IS-MBA degree and thus we also seek to convert this option to a joint MBA-MSIS program. Similarly, the Smith School currently offers a Post-Baccalaureate Certificate in Cybersecurity Leadership, and students who complete that program and successfully gain admission to the MSB/IS may count up to 9 credits toward the MSB degree. We would seek to offer this same opportunity for students seeking entrance to the MSIS program. This program is also an ideal path for students who are interested in continuing on to pursue PhD programs in Information Systems.

Graduates from this program will have strong quantitative skills and knowledge of information technology that will position them to meet the increasing need for employees trained in STEM (Science, Technology, Engineering, and Math) disciplines. While the need for technology skills among information systems professionals is obvious, the modern information systems graduate increasingly needs significant mathematical knowledge as well, e.g., to understand how to manage and analyze copious amounts of data available to business and government enterprises. A unique strength of the proposed MSIS program is that it is structured to provide both technical skills (through courses such as Database Management, Data Networks and Infrastructures, Business Process Analysis for Information Systems, IS Security), and also build quantitative skills though a set of courses focused on business analytics (e.g., Data Models, Data Mining, Computer Simulation, Decision Analytics).

The number of information systems management and professional opportunities has consistently increased faster than most other employment opportunities. The Bureau of Labor Statistics states: "Employment of computer and information systems managers is expected to grow 17 percent over the

2008-18 decade, which is faster than the average for all occupations. New applications of technology in the workplace will continue to drive demand for workers." *Forbes* magazine lists the Master's in Information Systems as the 4th best Master's degree to obtain (tied with Mathematics), projecting the mid-career median compensation to be $95,500. *Forbes* also projects the employment increase for jobs associated with this degree to be over 23% over the period from 2012 to 2023.

Nationally, business schools are undergoing a significant shift in the applicant pool for Master's degree programs. Applications for traditional MBA programs that provide a general management focus have seen a sustained reduction nationwide. Contemporaneously, more students are seeking Master's degrees that specialize in a particular business field, including Information Systems. Several other peer institutions, including Carnegie Mellon University, Indiana University, and New York University, are offering similar Master's degree programs in Information Systems. Such degrees are becoming an increasingly common offering at peer and aspirational institutions. Nonetheless the demand for such programs continues to grow. Applicant statistics demonstrate the quality of students demanding this offering: thus far, applicants for Fall 2013 have an average GMAT of 683, an average GPA of 3.5, and an average of 1 year of work experience.

Characteristics of the Proposed Program

UMD's MS in Business is a 30-credit program: with approximately 60 new students admitted per year into the Information Systems concentration. Approximately the same level of enrollment is expected in the MSIS degree program in its first year. The number of applications continues to grow, from 105 in Fall 2011 when this concentration was first offered, to 304 applications in Fall 2013. Should this growth continue, a second cohort may be added, increasing the entering class to 120 students.

Applicants will apply to the University of Maryland Graduate School and must have completed all of the requirements for a baccalaureate degree prior acceptance, with particular emphasis on a sufficient mathematical background. All applicants must submit: a) transcripts from all undergraduate and graduate institutions that have been previously attended; b) Graduate Record Examination (GRE) scores or the Graduate Management Admissions Test (GMAT) scores; c) a complete online application form that includes a written essay articulating qualifications and motivation for pursuing advanced education; and d) two letters of recommendation from supervisors or from professors competent to judge the applicant's probability of success in graduate school. Another standardized test in lieu of the GRE or GMAT can be substituted at the discretion of the Academic Director.

After initial screening, the Smith School Admissions Office may select candidates for interviews which may be done in person, by telephone, or via the internet (e.g., Skype). Proof of English language proficiency (TOEFL or IELTS official scores) is also required unless the applicant has received an undergraduate or graduate degree from a select list of countries. For international students requiring an F1 visa, a completed certification of finance form and supporting financial documentation are required.

Catalog Description

The Masters of Science in Information Systems degree (MSIS) is a professional degree for students wishing to pursue careers in Information Systems design, development, consulting or related fields. Core courses focus on building technology and quantitative skills, providing excellent fundamental knowledge of information systems concepts and business analytics techniques. Students may select from a small number of targeted electives to deepen their knowledge of core areas. They will learn how to analyze and direct the information systems decisions of an organization, how to use advanced statistical techniques to analyze data to inform decision-making, and gain a fresh understanding and a deep appreciation for the theoretical foundations of Information Systems today.

Curriculum

Students will enter the MSIS program with a Bachelor's degree. The proposed MSIS program requires 30 credit hours comprised of core courses (21 credits) and electives (at least 9 credits). Completion of the degree will typically be achieved within 2 years, but is feasible within 1 or 1.5 academic years for students who wish to accelerate the program. Sample student schedules and course descriptions are provided in Appendix A.

While not required, some students may pursue the option of writing a master's thesis as part of reaching their 30 credit hours requirement. Others may take advantage of experiential learning opportunities for course credit. In both cases, such credit would be limited to 6 credit hours, be overseen by a faculty member, and follow the Graduate School's guidelines for the Master's degree with thesis.

Expected Learning Outcomes

The proposed MSIS program offered by the Robert H Smith School of Business will provide students with:

a) Strong foundational understanding of information technology and quantitative approaches to decision-making;

b) Comprehensive knowledge of concepts necessary for engaging in any information systems project;

c) In-depth understanding of techniques to analyze organizational processes from a systems perspective;

d) The ability to design and leverage database structures necessary for managing organizations' information;

e) The project management skills and abilities to effectively plan and manage projects that meet their organization's business goals;

f) Analytical skills including a strong understanding of statistics;

g) Knowledge of the legal and ethical issues related to information systems management and an understanding of the role of all stakeholders when information systems decisions are made;

h) Expertise in information systems and business analytics that will make our students valuable contributors to a variety of employers and organizations in diverse communities.

A description of how the program outcomes will be organized and assessed is included as Appendix B.

While the University of Maryland's Robert H. Smith School of Business is accredited by the American Association of Collegiate Schools of Business (AACSB), no specialized accreditation is sought for this program.

Other programs within the state of Maryland

Information Systems is a popular and growing field, and a number of institutions within Maryland offer similar programs. Some have similar elements in their curriculum but none are substantively similar to the program at College Park in content or delivery.

Towson University offers an MS in Applied Information Technology through the College of Science and Mathematics. The degree is completed by earning at least one certificate (e.g., in Database Management Systems) along with completion of 18 elective credits, either online or face to face. The degree can be completed online or on campus. The program does not include the focus on Business and Analytics that are part of our core curriculum and ours is a fulltime, on-campus program. University of Maryland, Baltimore County offers an MSIS consisting of 39 credits, open to students from a variety of backgrounds. UMBC also offers an online version targeted at working professionals, consisting of 34 credits which can be completed in 2 years. Our program is distinguished from this one based on the core courses in Business and Analytics. Our program is on-campus only, and can be completed in as little as one year. John Hopkins University, Carey School of Business, offers an MSIS as a part-time program in Washington, targeting working professionals with at least two years of experience. In contrast, ours is a full-time program open to students with any level of experience. University of Maryland, University College offers a wide variety of online MS degrees. The most similar is the online MS in Information Technology. Students select among several areas of specialization (e.g., Homeland Security, Information Assurance) that are not covered in our program. Bowie State University offers a Master of Science in Management Information Systems, including a concentration in Information Assurance. These programs, in which students can participate either full-time or part-time, do not require the GMAT or GRE.

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the use of data and information to support key business decision-making. While there is some overlap in the curricula, these three programs are quite distinct in terms of overall training and career paths.

Academic Oversight, Quality Control and Student Services

Primary oversight of this program will be provided by a faculty member assigned as the director of the program. A committee of faculty members has been created to address issues including admissions, academic policies, student activities, and internship / placement opportunities. The program would also be overseen by the chair of the Decision, Operations, and Information Technology (DO&IT) department and the Dean's office.

The department of Decision, Operations, and Information Technologies at the Robert H. Smith School of Business currently has a faculty of 35 FTE. Twenty-five of these are tenured/tenure track. All faculty members have doctoral degrees in information systems, computer science, statistics, or related areas.

Method of Delivery

Currently, the program is structured to be entirely delivered in a traditional classroom setting. Over time, we may evaluate online and/or blended learning opportunities. Should courses move to an online format, the guidance outlined in COMAR 13B.02.02.22C: "Principles and Guidelines for Distance Education Programs" will be followed.

In addition to holding classes on the College Park campus, some sections of the program may meet at our DC location in the US Department of Commerce (Reagan) building or at the Universities of Shady Grove. Those facilities already contain adequate classrooms, computer facilities, study rooms, and administrative space for academic advising, career advising, and student activity support.

Commitment to Diversity and the State's Minority Achievement Goals

The Robert H. Smith School of Business community is multifaceted at every level – students, staff and faculty represent a diverse blend of backgrounds, nationalities, ethnicities and experiences. About a dozen Smith School and student clubs are focused on bringing members together who have similar interests in gender, nationality, religion, and sexual orientation.

Current efforts include a wide range of recruiting efforts, including visits to academic program fairs, use of social media, visits to U.S. colleges and universities, presentations at professional conferences, and participation in Graduate Business Education events targeted for populations typically underrepresented in graduate business programs, particularly U.S. minorities and women. Future efforts will include targeted recruiting towards military families and veterans, highlighting of alumni and current graduate students who reflect a more diverse population.

Resources and Finance

Because this program replaces a current concentration within another program and we do not at this time anticipate growing it beyond its current scale, no additional courses, changes in advising, physical resources, or administrative workload are anticipated. Approval of this proposal would not alter the responsibilities of the faculty beyond those already generated by the existing Masters of Science in Business and Management with the concentration in Information Systems that this proposal seeks to replace.

The President assures that institutional library resources meet new program needs.

Appendix A: Course Descriptions

Sample Student Schedule

Below are tables showing how a typical MSA student can complete the required coursework over a one-year period as a full-time student and over a two-year time period as a full-time or part-time student.

Student Schedule for Full-time MSIS (Master of Science in Information Systems) completed in three semesters

	Fall	Spring
First Year	BUSI 622 Managing Digital Business Markets BUDT 704 Database Management BUDT 758 Data Models BUDT 705 Data Networks and Infrastructures	BUDT 703 Business Process Analysis BUDT 758 Data Mining BUDT 758 Decision Analytics BUDT 758 IS Security
Second Year	BUSI 621 Strategic and Transformational IT BUSI 785 Project Management BUDT 740 IS Projects	

Sample Student Schedule for MSIS, completed in 4 semesters

	Fall	Spring
First Year	BUSI 622 Managing Digital Business Markets BUDT 704 Database Management BUDT 758 Data Models	BUDT 703 Business Process Analysis BUDT 758 Data Mining BUDT 758 Decision Analytics
Second Year	BUDT 705 Data Networks and Infrastructures BUSI 621 Strategic and Transformational IT BUSI 785 Project Management BUDT 758 Data Processing in Python	BUDT 740 IS Projects

Core Courses

BUSI 621 Strategic and Transformational IT (2 credits): Introduces students to the key issues in managing information technology (IT) and provides an overview of how major IT applications in today's firms support strategic, operational, and tactical decisions. Topics include: synchronizing IT and business strategy; the transformational impacts of IT; evaluating and coping with new technologies; governing, managing, and organizing the IT function including outsourcing/offshoring considerations; assessing the business value of IT and justifying IT projects; and managing IT applications in functional areas to support strategy and business process.

BUSI 622 Managing Digital Business Markets (2 credits): Introduces students to the strategic and tactical issues involved in managing digital businesses and markets. Explores some of the

characteristics of digital businesses and markets that make them unique to develop an understanding of how companies can best manage them.

BUSI 785 Project Management in Dynamic Environments (2 credits): Addresses project management skills that are required by successful managers in increasingly competitive and faster-moving environments. Examines fundamental concepts of successful project management, and the technical and managerial issues, methods, and techniques.

BUDT 703 Business Process Analysis for Information Systems (3 credits): Helps students gain a solid foundation in the concepts, processes, tools, and techniques needed in analyzing business processes and conducting information systems projects.

BUDT 704 Database Management Systems (3 credits): Introduction to the conceptual and logical design of relational database systems and their use in business environments. Topics include information modeling and optimization via normalization; Structured Query Language (SQL); Client/Server architectures; Concurrency & Recovery; Data Warehousing.

BUDT 758 Data, Models, and Decisions (3 credits): Analytical modeling of business decisions; uncertainty, risk and expected utility; regression modeling to infer relationships among variables.

BUDT 705 Data Networks and Infrastructures (3 credits): Technical and managerial aspects of business data communications, networking, and telecommunications with a particular emphasis on internet-based technologies and services. Content includes history and structure of the telecommunications industry, including key legislative, regulatory and legal milestones, and management of the technical and functional components of telecommunications and data communications technology.

BUDT 758 Information Systems Project (3 credits): Students apply concepts and techniques learned in core courses to complete a project fulfilling some real business requirements.

Elective Courses

In addition to these information systems and business analytics electives, and upon approval of the academic advisor, students may take up to three credits in a related field. Students must select at least 2 electives from set 1.

Set 1:

BUDT 758 Data Mining and Predictive Analytics (3 credits): Data mining techniques and their use in business decision making. A hands-on course that provides an understanding of the key methods of data visualization, exploration, classification, prediction, time series forecasting, and clustering.

BUDT 758 Decision Analytics (3 credits): Analytical modeling for managerial decisions using a spreadsheet environment. Includes linear and nonlinear optimization models, decision making under uncertainty and simulation models.

BUDT 758 Computer Simulation for Business Applications (3 credits): This course covers the basic techniques for computer simulation modeling and analysis of discrete-event systems. Course emphasis is on conceptualizing abstract models of real-world systems (for example, inventory or queuing

systems), implementing simulations in special purpose software, planning simulation studies, and analyzing simulation output.

Set 2:

BUDT 758 IS Security (3 credits): Provides students foundational knowledge of information systems security threats, risk assessment, and approaches to ensuring security.

BUDT 758 Data Processing in Python (3 credits): Covers core concepts and techniques in designing and building software programs to support business requirements.

BUDT 758 Special topics in Decision, Operations, and Information Technologies (credits may vary)

BUDT 759 Independent Study in Decision, Operations, and Information Technologies (credits may vary)

Appendix B: Student Learning Outcomes and Assessment

Learning Outcome 1	Students will demonstrate a clear understanding of the basic concepts of systems analysis and design, database management, information systems strategy, and technology-enabled business models.
Measure:	Students will be required to pass a core set of classes in these areas.
Criterion:	At least 90% of students will receive a rating of "Satisfactory" or better based on a review of their performance in the core classes. The Academic Director will advise students rated below "Satisfactory" to help improve their performance or determine their continued participation in the program.
Assessment:	Every Year, starting in the 2013-2014 academic year.

Learning Outcome 2	Students will demonstrate critical reasoning and written communication skills through the analysis of information systems case studies.
Measure:	Students must take at least one class that uses the case study method.
Criterion:	At least 90% of students will receive a rating of "Satisfactory" or better from the course instructor.
Assessment:	Every Year, starting in the 2013-2014 academic year.

Learning Outcome 3	Students will demonstrate oral communication skills through the presentation of an information systems case study.
Measure:	Students must make at least one presentation of a case study.
Criterion:	At least 90% of students will receive a rating of "Satisfactory" or better from the course instructor.
Assessment:	Every Year, starting in the 2013-2014 academic year.

Learning Outcome 4	Students will demonstrate their ability to work effectively with other members of a team in the preparation of a group project.
Measure:	Students must prepare group projects as part of a class.
Criterion:	At least 90% of students will receive a rating of "Satisfactory" or better from the course instructor.
Assessment:	Every Year, starting in the 2013-2014 academic year.

Learning Outcome 5	Students will demonstrate the ability to conduct complex data analysis tasks to inform managerial decisions.
Measure:	Students will be required to pass a core set of business analytics classes.
Criterion:	At least 90% of students will receive a rating of "Satisfactory" or better based on a review of their performance in the core classes. The Academic Director will advise students rated below "Satisfactory" to help improve their performance or determine their continued participation in the program..
Assessment:	Every Year, starting in the 2013-2014 academic year.

Table 1: Resources			
Resources Categories	Year 1	Year 2	Year 3
1.Reallocated Funds	None	None	None
2. Tuition/Fee Revenue ("a x d" below)	$2,137,500	$2,201,625	$2,267,674
a. FT Students	100	100	100
b. Credit Hour Rate	$1,425	$1,467.75	$1,512
c. Annual Credit Hours	15	15	15
d. Annual Fee Rate	$21,375	$22,016	$22,677
3. Grants, Contracts, & Other External Sources	None	None	None
4. Other Sources	None	None	None
TOTAL (Add 1 - 4)	$2,137,500	$2,201,625	$2,267,674

* The tuition/fee revenue is based a graduate tuition rate of $1,425 per credit hour, as approved by the USM Board of Regents.

Table 2: Expenditures			
Expenditure Categories	Year 1	Year 2	Year 3
1.Total Faculty[*] (b+c below)	$907,500	$934,725	$962,767
a. #FTE	4	4	4
b. Total Salary	$726,000	$747,780	$770,213
c. Total Benefits	$181,500	$186,945	$192,553
2.Total Administrative(b+c below)	$74,643	$76,882	$79,189
a. #FTE	3	3	3
b. Total Salary	$59,715	$61,506	$63,351
c. Total Benefits	$14,929	$15,376	$15,838
3.Total Support Staff (b+c below)	$692,638	$713,417	$734,819
a. #FTE	9	9	9
b. Total Salary	$193,984	$199,804	$205,798
c. Total Benefits	$48,496	$49,951	$51,449
4. New or Renovated Space			
5. Student Services	$51,875	$51,875	$51,875
6. Marketing	$50,000	$50,000	$50,000
7. Recruiting & Admissions	$55,000	$55,000	$55,000
8. Career Services	$30,150	$30,150	$30,150
9. Student Aid	$25,000	$25,000	$25,000
10. Other Expenses	$0	$0	$0
TOTAL (Add 1 - 10)	$1,886,806	$1,937,049	$1,988,800